DOCUMENT RESUME

ED 227 437 CG 016 571

AUTHOR	Tabor, Lila; And Others
TITLE	The Effects of Verbal Labeling on Optional Shift Performance of Young and Old Adults.
SPONS AGENCY	North Dakota Univ., Grand Forks.
PUB DATE	May 82
NOTE	19p.; Paper presented at the Annual Meeting of the Midwestern Psychological Association (54th, Minneapolis, MN, May 6-8, 1982). Best copy available.
PUB TYPE	Reports - Research/Technical (143) -- Speeches/Conference Papers (150)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Age Differences; Cognitive Processes; Cohort Analysis; College Students; Gerontology; Higher Education; Intellectual Development; Intelligence; Learning Theories; Older Adults; Performance Factors; *Shift Studies; *Visual Discrimination; Young Adults
IDENTIFIERS	*Verbal Labeling

ABSTRACT

The few studies concentrating on adult age changes in discrimination shift behavior have reported that the performance of elderly adults on such tasks is inferior to that of younger adults and, in fact, similar to that of children. To determine whether verbal labeling, which has facilitated the performance of young children, would also reduce age decrements in the discrimination shift behavior of elderly adults, 32 college students and 26 older adults were randomly assigned to one of two optional shift conditions. In the label condition, subjects were encouraged to verbalize the value of the dimension made relevant by reinforcement in the initial learning phase. In the no label condition, subjects proceeded as usual, i.e., without verbalizing the correct values of the relevant dimension. Analyses of results indicated an absence of age-related differences in the number of reversal shift choices; however, older adults made reversal shifts less often than did younger adults. Although older adults' initial learning performance on the optional shift task was facilitated by labeling, their shift discrimination performance was actually impeded by labeling. (Author/JAC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

BEST COPY AVAILABLE

ED227437

The Effects of Verbal Labeling on Optional Shift Performance of Young and Old Adults

Lila Tabor, Ph.D. and Tom Petros, Ph.D.
University of North Dakota
Stephen Ceci, Ph.D.
Cornell University

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Lila C. Tabor

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

This research was made possible by a Faculty Research Grant from the University of North Dakota to Lila Tabor. Portions of this study were presented at the Annual Meeting of the Midwest Psychological Association, Minneapolis, Minnesota, 1982. The authors gratefully acknowledge the kind cooperation of the staff and members of the Greater Grand Forks Senior Citizens Center and especially Dr. T. Reiff of the Institute of Gerontology and Geriatric Medicine. Requests for reprints should be addressed to: Lila Tabor, Department of Psychology, University of North Dakota, Grand Forks, ND 58202.

CG 016571

Abstract

Young adults (M = 20 years) and old adults (M = 72 years), matched for intelligence, were randomly assigned to one of two optional shift conditions. In the label condition, subjects were encouraged to verbalize the value of the dimension made relevant by reinforcement in the initial learning phase. In the no label condition, subjects proceeded in the usual manner through the various phases of the discrimination shift paradigm, i.e., without verbalizing the correct values of the relevant dimension. Results indicated an absence of age-related differences in the number of reversal shift choices; however, older adults made reversal shifts less often than did younger adults (56% vs 78%). Although older adults' initial learning performance on the optional shift task was facilitated by labeling, their shift discrimination performance was actually impeded by labeling. These findings are discussed in terms of current notions about cognitive rigidity and perseveration.

There is considerable current interest in the effects of aging on cognitive processes (e.g., Craik, 1977). Even though Botwinick (1970) has noted that the reversal-non-reversal shift paradigm could give clues as to the type of learning habits elderly people have, few studies to date have concentrated on adult age changes in discriminative transfer behavior. Those which have generally reported that elderly individuals not only do not perform as well on such tasks as younger adults, but that in fact their performance is similar to that of children, i.e. mediationally deficient (Nehrke and Coppinger, 1971; Witte, 1971; Nehrke, 1973; and Shanab and Qassim, 1978). A mediated response is a response to some internal representation rather than to a specific stimulus value. For example a response to assorted small geometric figures as representatives of the value "small" of the dimension "size" would be a mediated response. A mediationally deficient response would entail reacting to each stimulus only in terms of its particular reinforced characteristics.

Since age-related decrements in discriminative transfer behavior are thought to exist, it seems important to determine whether or not there are training procedures which could be of practical benefit to elderly individuals in reducing such decrements especially on the many non-laboratory types of cognition that require this behavior. Therefore the present study

investigated one potential training procedure, verbal labeling, on the optional shift performance of young and old adults.

The optional shift task is commonly used to determine whether or not an individual is responding to the dimension of a stimulus array (e.g., size) initally made relevant by reinforcement contingencies in a concept shift paradigm. A subsequent reversal shift within the relevant dimension is assumed to denote a higher-level, mediated response to a particular dimension instead of a reinforcement-based tendency to respond to particular stimuli.

Kendler (1964) noted that since older children and college age adults have less difficulty in making reversal shifts than young children, some form of mediating system which facilitates dimensional responding must be available to the older groups. She found that verbally labeling the correct stimulus of the relevant dimension significantly increased optional reversal shifts in kindergarten children. In a later study, Kendler (1974) showed that the facilitating effects of labeling decrease systematically over the age range of childhood to young adulthood, leaving the optional shift response of college students unchanged. In different experimental areas Hulicka and Grossman (1967) and Canestrari (1968) reported that elderly individuals who are mediationally deficient in associate learning tasks benefit more from the provision of a mediater than younger subjects.

Since the responses of elderly adults to various discrimination shift tasks are alleged to be like those of children, (e.g. Shanab & Qassim,, 1978), and since verbal labeling facilitates reversal shifts in children, a logical step would seem to involve assessing the effect of verbal labeling on the optional shift behavior of elderly individuals. If elderly people are indeed mediationally deficient, providing an external mediator, a label for the correct value of the revelant dimension, should increase the probability of their making optional reversal shifts. In view of past research (Hulicka and Grossman, 1967; Canestrari, 1968; Kendler, 1964) the provision of such a label should have no effect on the optional shift choices of college students.

Method

Subjects

Thirty two young (17 male; 15 female) and 26 older adults (5 male; 21 female) served as subjects. Within each age group, subjects were randomly assigned into label and non-label groups. The younger adults were students in introductory psychology courses and received course credit for participation. Older adults were recruited from a local senior citizen center and received $5 for participation. Table 1 presents demographic data for each group.

- - - - - - - - - - - - - - -

Insert Table 1 about here

- - - - - - - - - - - - - - -

Materials

Each of the 4 stimulus configurations used in the task was photographed resulting in prints of two black geometric stimuli against a white background. Several prints were made of each configuration to insure an uninterrupted presentation of cards to subjects. The geometric figures represented the dimensions of form (circle vs. triangle) and size (large vs. small). These particular dimensions were chosen because individuals are equally apt to make optional reversal shifts if either size or form is the relevant dimension (Kendler, 1974).

Procedure

For the optional shift task subjects were told that on any one trial they would be presented with two geometric figures and that they were to pick the correct one. They were presented with stimulus pairs which differed simultaneously on two dimensions, size (large vs. small) and shape (circle vs triangle). The procedure consisted of three phases (see Figure 1) the initial discrimination, shift discrimination and test discrimination. In this example size is the relevant dimension. In the initial discrimination the two pairs of stimuli, large and small circles and triangles were presented one pair at a time and the subject

was reinforced for responding to "large". After each incorrect choice the same pair was again presented until the correct figure was chosen. After the subject learned the initial discrimination (10 successive correct responses) the shift discrimination phase was begun with no noticeable break in the procedure. During the shift discrimination the reinforcement contingencies for one pair of stimuli "large triangle" and small circle" were reversed so that the previously non-reinforced stimulus "small circle" was now reinforced. Since only one pair of stimuli was presented during the shift discrimination, both dimensions became relevant and redundant, i.e. the subject might have been responding to size (small) or form (circle) as he/she learned the shift discrimiation. After criterion was reached on the shift discrimination the test discrimination immediately followed. During this phase both stimulus pairs were again presented and either choice on the test pair was rewarded while the relearning pair retained the same reinforcement pattern as in the shift discrimination (see Figure 1). Consistent responding (8 of 10) to "small triangle" during the test discrimination indicated a reversal shift while all other patterns of response were categorized as non-reversal responses.

Participants were tested individually in a private experimental room. The experimenter placed the appropriate card in front of the person and asked him/her to point to the correct figure.

Individuals assigned to the label condition were asked to label the relevant cue. For example, if large was the relevant cue they were asked to say "Big wins, small loses" as they pointed to one of the geometric figures on the card. They were only given label instructions during the initial discrimination, and after labeling the relevant cue 7 or 8 times, they were told that it was no longer necessary for them to say anything as they pointed. The relevant cue in the initial discrimination occurred equally often for each of the four stimulus types i.e. large, small, circle and triangle.

After completing the optional shift task, the Peabody Picture Vocabulary Test (PPVT) (Dunn, 1965) was administered to each individual. Following this, participants were debriefed and thanked for their participation.

Results

In order to determine whether the effects of age or label were confounded by differences in intelligence (raw scores on the Peabody Picture Vocabulary Test) a 2(age) x 2(label) analysis of variance was conducted on the PPVT scores. No significant effects were observed ($p > .25$); any age or label differences could not be attributed to differences in intelligence amoung the four groups.

A 2(age) x 2 (label) analysis of variance was conducted on the trials to criterion during the initial and shift discriminations.

During the initial discrimination significant main effects of age F (1,53) = 5.61, $p < .03$, and label, F (1,53) = 7.73, $p < .01$, were revealed with no significant interacton (see Table 2). Younger adults took fewer trials to learn the initial discrimination (M = 3.78) than older adults (M = 12.61) and individuals who received a label took fewer trials to learn (M = 3.01) than did no-label subjects (M = 13.38). It was, of course, expected that labeling the correct choice on this initial discrimination would reduce trials to criterion since labeling, in effect, pointed out to the subjects which dimension value was correct.

- - - - - - - - - - - - - - -

Insert Table 2 about here

- - - - - - - - - - - - - - -

Shift Discrimination

During the shift discrimination significant main effects of age F (1,53 = 7.03, $p < .02$, and a marginal main effect of label F (1,53) = 3.43, $p < .07$, were observed with no significant interaction. As can be seen in Table 2 younger adults took fewer trials to solve the shift discrimination (M = 4.38) than older adults (M = 10.74), and individuals who were provided with a label during original learning took longer to solve the shift discrimination (M = 9.78) than did the no-label subjects (M = 5.34). Evidently labeling the correct dimensional cue facilitated learning the

initial discrimination but caused individuals to perseverate on the non-incorrect cue during the shift discrimination.

It is possible that the observed group differences in shift discrimination performance could have resulted from group differences in the number of trials required to solve the initial discrimination. Consequently the differences in the number of trials required to solve the initial and shift discrimination tasks were computed for all subjects and these difference scores were subjected to a 2(age) x 2(label) analysis of variance. A significant main effect of label F (1,53) = 12.51, $p < .01$ and a marginal age x label interaction were found F (1,53) = 3.66, $p < .07$. Again, the subjects who were given a label during the initial discrimination took longer to solve the shift discrimination; however, the difference between the initial and shift phase learning was greater for older adults (see Table 2).

Optional Reversal Shifts

It was expected that older adults would make fewer reversal shifts than college students and that labeling would facilitate reversal shifts for older individuals but not for younger ones. However, although 78% of the college students made reversal shifts compared to 56% of the older people (see Table 2) this difference was not significant ($\chi^2 = .4065$, $p < .50$). Thus elderly people were not mediationally deficient compared to college students, and labeling did not facilitate optional reversal shifts for either group.

Discussion

Although labeling did not facilitate reversal shifts in older adults, evidently labeling the correct dimensional cue in the initial discrimination tended to make learning the shift discrimination more difficult for the older subjects. This finding is consistent with the conceptualization of cognitive rigidity as a diminished ability to unlearn anything incorporated into an already established thought system (Botwinick, 1978).

Botwinick (1970) and Ceci & Tabor (1981) also noted that when rigidity does occur it may be correlated with a general learning deficit and that it is difficult to determine which of these is primary. In other words, in this study if difficulty in learning the shift discrimination was related to difficulty learning the initial discrimination, perseveration on the shift discrimination may have reflected a general learning deficit instead of rigidity. Although in this study elderly people in the no-label condition did take longer to learn both discriminations than did younger individuals, subjects using a label took fewer trials to learn the initial discrimination than those in the no-label group, yet these label condition subjects actually needed more trials to learn the shift discrimination than their peers in the no-label condition. This pattern was marginally more evident in elderly adults. Since the label facilitated original learning yet inhibited learning the shift

discrimination, it appears that in this study, at least, rigidity was unrelated to deficits in original learning. Nor was it related to differences in intelligence since the groups were equated for this characteristic.

Our expectations, were that elderly individuals would be mediationally deficient compared to college students and that providing an external mediator, a verbal label, would facilitate reversal shifts in the older adults. The pattern of trials to criterion in our data would lead us to expect age differences since Kendler (1974) reported that mean trials to criterion for both the initial and the shift discriminations decreased systematically with age level from kindergarten to college while the proportion of reversal shifts increased systematically with age. The present study found that trials to criterion on both the initial and the shift discriminations increased significantly with age, and therefore, on the basis of Kendler's findings we expected a corresponding decrease in the proportion of elderly individuals making reversal shifts.

Even though there was a substantial numerical difference between the proportion of elderly and college-aged subjects in our study making reversal shifts (56% vs. 78%) this difference was not significant and thus possibly not large enough to allow the label to facilitate reversal shifts in the elderly.

One possible reason for our failure to find significant age differences in mediation is that other studies which reported mediational deficiency in elderly adults used slightly different methods, e.g. Nehrke (1973), or did not compare age groups (Nehrke & Coppinger (1971). Probably the most important difference between our study and other work (Nehrke, 1973; Witte, 1971; Shanab and Qassim, 1978) was their failure to control for intelligence as we did. Although intelligence has not been found to predict reversal shifts in children when only one optional shift task is presented (e.g. Kendler and Kendler., 1970), when more than one optional shift task is administered there is a significant relationship between intelligence and reversal shifts for children at the kindergarten level but not for second grade children (Wilson, 1972; Brier and Jacobs, 1972; Tabor, 1977). Thus under some circumstances intelligence does predict reversal shifts in the most mediationally deficient age group. If elderly adults perform more like preschool children on tests for mediation (Nehrke, 1973) and are compared to college students, one would expect that age-related decrements in shift behavior would be diminished when cohorts are equated for intelligence.

Table 1

Demographic Data

Age Group	Label Group	N	Age Mean	Age Range	Peabody Picture Vocabulary Raw Scores
Young	Label	17	20-6	18-0 to 27-2	117.94
Young	No Label	15	20-7	18-6 to 26-3	125.13
Old	Label	12	73-5	65-6 to 80-11	117.18
Old	No Label	14	72-3	61-9 to 80-11	117.64

Table 2

Age Group	Label Group	Mean Trials to Criterion Initial Disc.	Shift Disc.	Difference	Proportion of Reversal Shifts
Young	Label	1.29	5.29	-4.00	.76
Young	No Label	6.27	3.45	2.82	.80
Old	Label	4.73	14.27	-9.54	.55
Old	No Label	20.50	7.21	13.29	.57

References

Botwinick, J. Aging and Behavior, 2nd Ed. New York: Springer Publishing Co. 1978.

Botwinick, J. Learning in children and older adults. In Goulet, L. and Baltes, P. (Eds.), Life-span Developmental Psychology. New York: Academic Press, 1970, 258-279.

Brier, N. and Jacobs, P. Reversal shifting: its stability and relation to intelligence at two developmental levels. Child Development, 1972, 43, 1230-1241.

Canestrari, R. E. The effects of commonality on paired-associate learning in two age groups. Journal of Genetic Psychology, 1966, 108, 3-7.

Ceci, S. J. & Tabor, L. Memory and aging: Are the elderly really less flexible? Experimental Aging Research, 1981, 7. 147-158.

Craik, F. I. M. Age differences in human memory. In J. E. Birren & K. W. Schaie (Eds.), Handbook of the psychology of aging. New York: Van Nostrand Reinhold, 1977.

Dunn, L. M. Expanded Manual for the Peabody Picture Vocabulary Test. Minneapolis, MN: American Guidance Service, 1965.

Hulicka, I. M., & Grossman, J. L. Age group comparisons for the use of mediators in paired associate learning. Journal of Gerontology, 1967, 22, 46-51.

Hynds, Lila Tabor. A comparison of the development of class inclusion and symbolic mediation. Doctoral dissertation. University of California, Santa Barbara, 1976.

Kendler, T. Effects of training and stimulus variables on the reversal shift ontogeny. Journal of Experimental Child Psychology, 1974, 17, 87-106.

Kendler, T. and Kendler, H. Verbalization and optional reversal shifts among kindergarten children. Journal of Verbal Learning and Verbal Behavior, 1964, 3, 428-436.

Kendler, T. and Kendler, H. An ontogeny of optional shift behavior. Child Development, 1970, 41, 1-27.

Nehrke, M. Age and sex differences in discrimination learning and transfer of training. Journal of Gerontology, 1973, 28, 320-327.

Nehrke, M. and Coppinger, N. The effect of task dimensionality on discrimination learning and transfer of training in the aged. Journal of Gerontology, 1971, 26, 151-156.

Shanab, M. & Qassim, K. The effect of aging on reversal and extradimensional shifts in Jordan. Journal of Cross Cultural Psychology, 1978, 9, 339-347.

Wilson, S. A study of the relationship between Jensen's two level hierarchical theory of mental ability and Kendler's two-stage developmental mediation theory. Doctoral dissertation. University of California, Santa Barbara, 1972.

Witte, K. Optional shift behavior in children and young and elderly adults. Psychonomic Science, 1971, 25, 329-330.

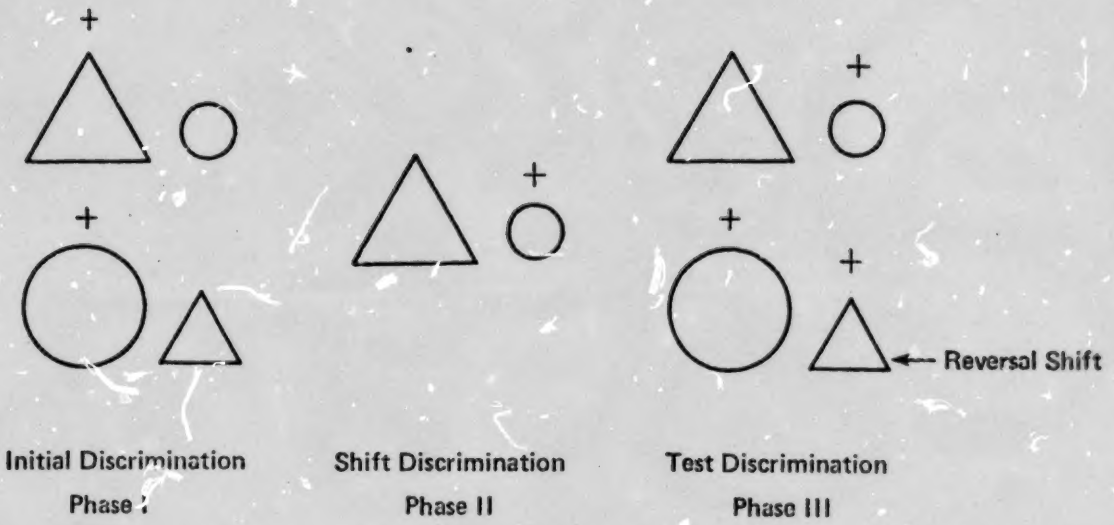

Fig. 1 Illustration of the optional shift paradigm